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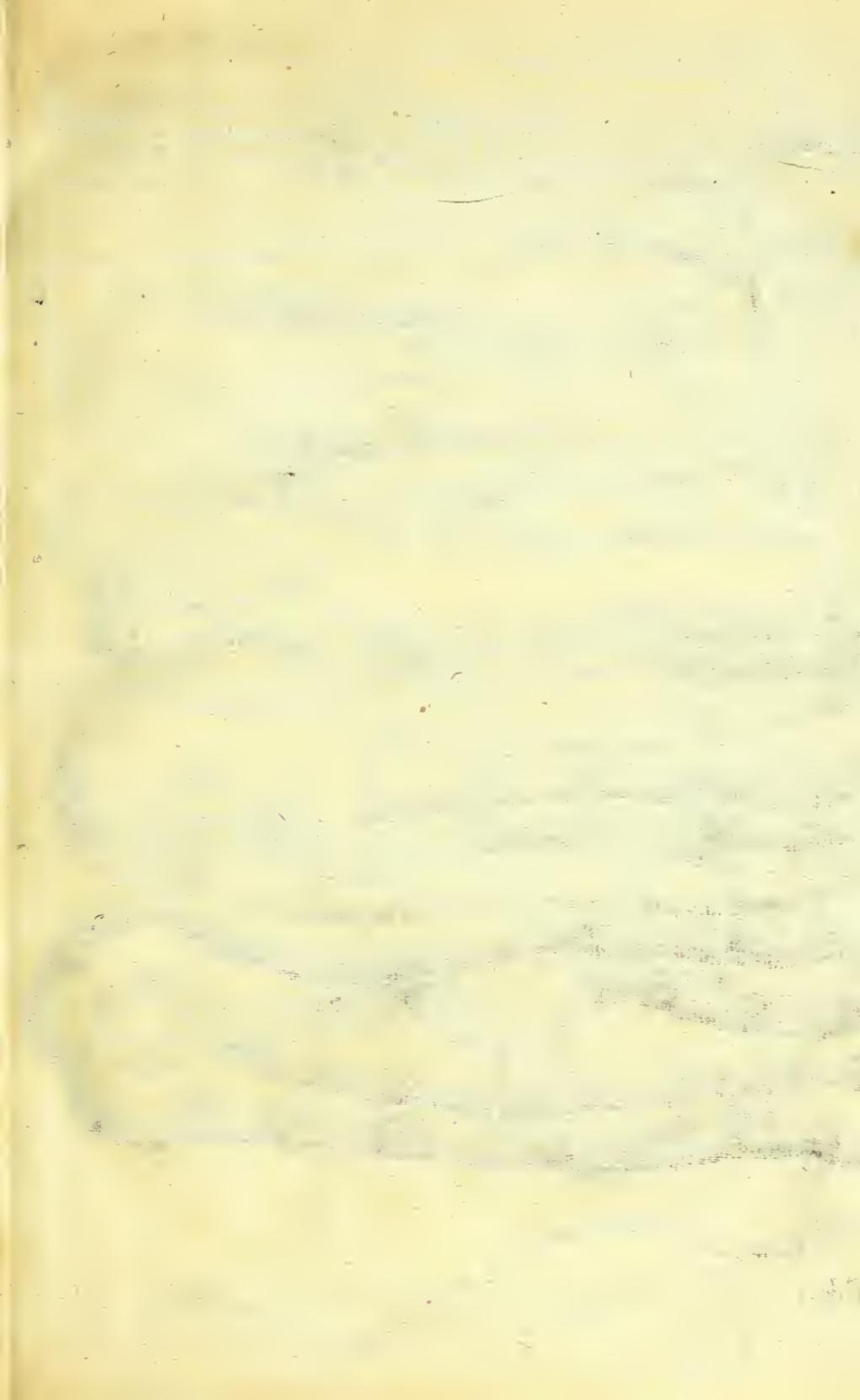
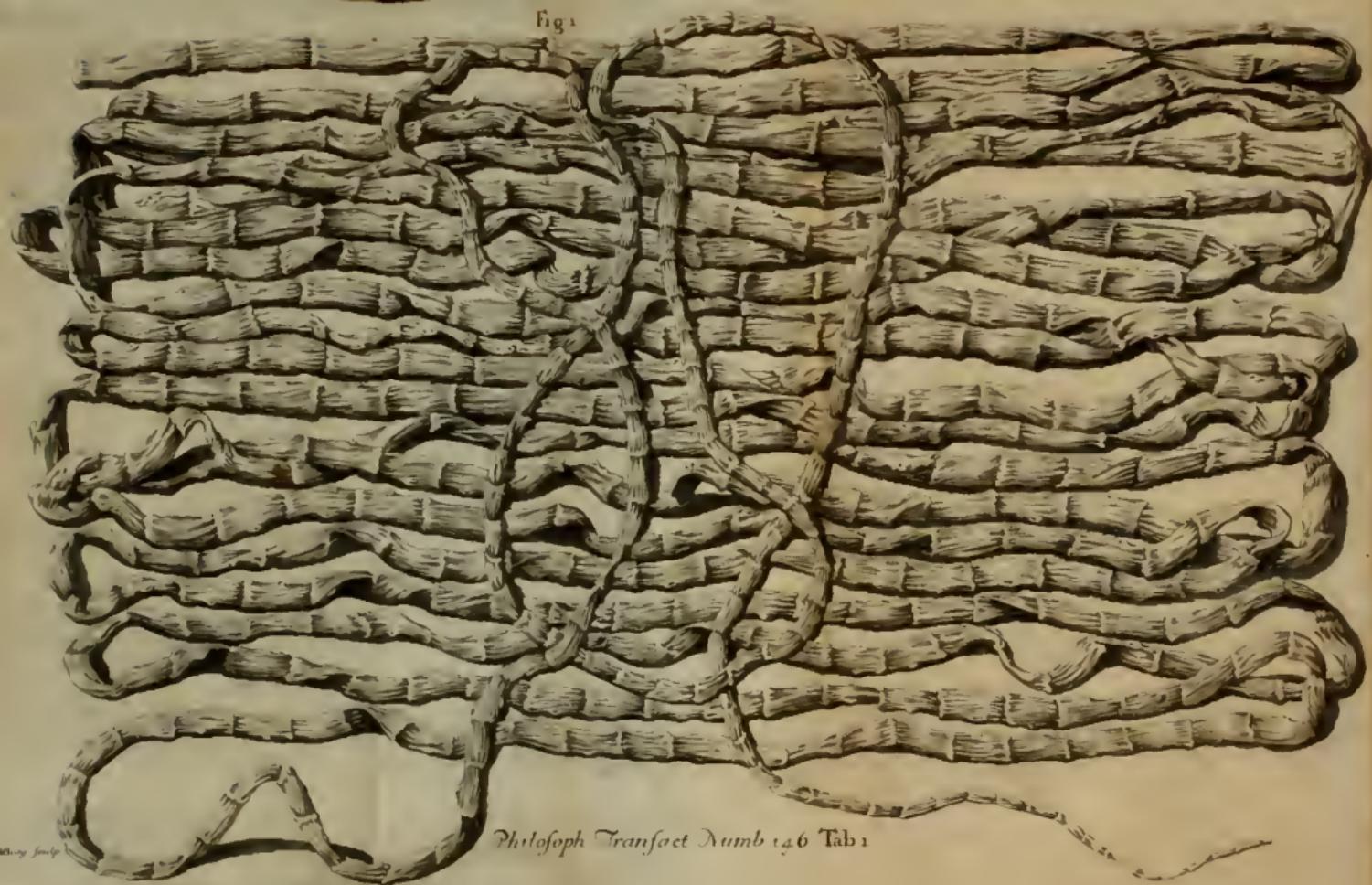


Fig 1



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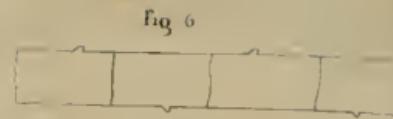
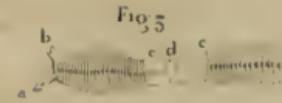
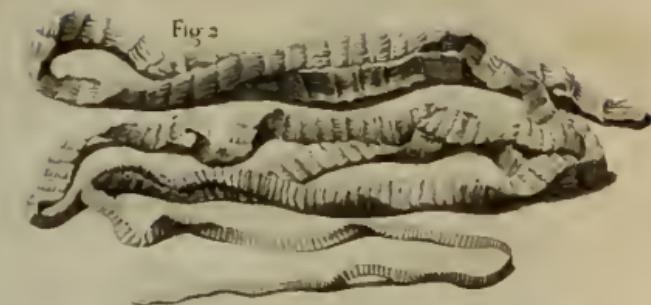
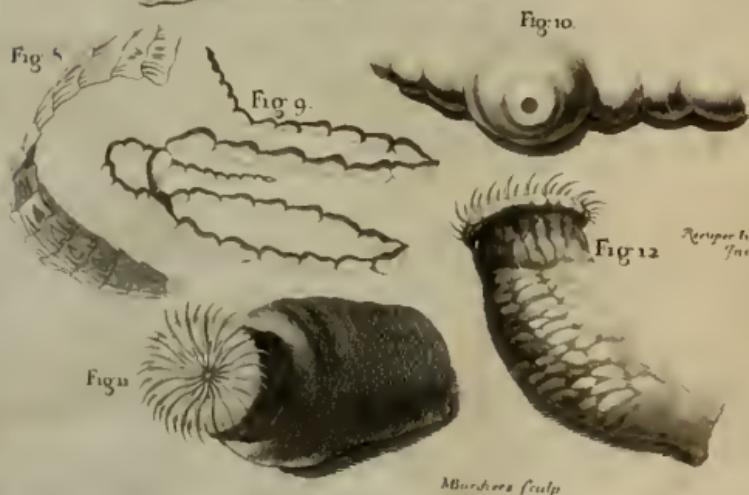


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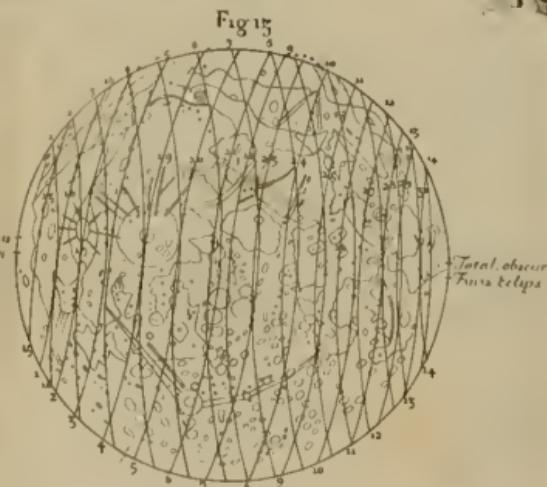


Fig 5



Murphy sculp

Rectiper fumatus
Gmelin



PHILOSOPHICAL TRANSACTIONS.

April 10, 1683.

The CONTENTS.

1. *LUMBRICUS LATVS*, or a Discourse read before the Royal Society, of the Joynted Worm, wherein a great many Mistakes of former Writers concerning it, are remarked; its Natural History from more exact Observations is attempted; and the whole urged, as a Difficulty, against the Doctrine of Univocal Generation: by Edward Tyson M. D. Col. Med. Lond. nec non Reg. Societ. Soc.
2. Observations of the Eclipse of the Moon Feb. 21 1682, by divers learned Astronomers at divers places.
3. Observations of the same Eclipse at Dantzick by the judicious Astronomer Joh. Hevelius, as sent by Him to the Royal Society.

1. *LUMBRICUS LATVS*, or a Discourse read before the Royal Society of the Joynted Worm, wherein a great many Mistakes of former Writers concerning it, are remarked; its Natural History from more exact Observations is attempted; and the whole urged, as a Difficulty against the Doctrine of Univocal Generation: by Edward Tyson M. D. Col. Med. Lond. nec non Reg. Societ. Soc.

THe consideration of Insects, and their manner of generation, as it is a subject of curious speculation; so of late hath been much illustrated by the laborious researches of many inquisitive persons: whose tra-

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vels

vels therein, tho' they have much advanced the doctrine of *univocal generation*; and bid very fair for the exploding of that, too easily received, and common error, of their production from *putrefaction*, yet one great difficulty still remains with me, how to account for several of those, that are bred in *Animal bodies* not such as we may suppose to be hatched from the eggs of the like kind, that are received with the food or other ways; but of whom we cannot meet with a parallel, or of the same *Species*, out of the body, in the whole world as is known besides. I shall instance onely in two, the *Lumbricus Latus*, and *Teres*. Of the former I shall give at present onely these remarks; wherein it's difference from any other does more remarkably appear. 1. being flat. 2. joyned after a peculiar manner. 3. the great disproportion of both extremes. 4. the vast length tis often of. 5. the head so remarkably beset with hooked Spikes. 6. what has never that I know of, been remarked of this, or any other Insect or Animal in the World besides; the great number of *Mouths* it hath; more than the Poets fain'd *Briareus* had hands, or *Argus* eyes, viz. in every Joyn one. 7. That any part of the body being broken off from the rest, should still remain alive, and thrive.

All which *particulars*, besides what others may be added, if duly considered, will render it difficult to give an instance of the like out of the body, from whence, or from the *Seed* of the same, it may be any ways thought, this may be propagated here.

My other Instance is the *Lumbricus teres Intestinalis*; which tho' it holds more analogy with those called *Intestina Terræ*, or common *Earth-Wormes*, as to the outward shape and forms; yet within are vastly different; as by comparing the *Anatomy* of both, will appear. And I very much question, as to the contrivance of the inward Organs, whether we can meet with any parallel of it, in the World, out of the *Microcosme*, or *Animal bodies*, besides

sides. For altho' different *Climes*, or different places of habitation might much affect the outward shape, and cause a difference ; yet it is hard to conceive, how it should cause so vast an alteration, in the most principal inward Organs. However tho' we are gravel'd, in assigning how first *this* sort of *Worm* should come into the body ; yet being once there ; there is nothing more plain, than that they are propagated by an univocal generation ; there being so perfect a distinction of Sexes, *Male* and *Female* ; and the Organs belonging to each so curiously contrived, so conspicuous and plain ; that they may further illustrate the late Inventions of some ; and do seem to shew, how solicitous *Nature* is in preserving, and propagating the meanest *Species*. But as in *this* Worm, there is a most evident discrimination of Sexes ; so in *Earth-worms*, there is nothing of this nature to be found but they are perfect *Hermophrodites*, each *Worm* having the Organs belonging both to *Male* and *Female* ; which is common to them with *Leeches*, *Snails*, &c.

I shall give the observations I have made, upon *both* of them ; such rather as may respect their *Natural History*, and may be most suitable to this occasion ; than their *Medical account* ; which it may be hereafter, I may more enlarge upon : Nor do I think this may be unserviceable to our faculty ; for such hints as do improve the *Theory*, will the *Praxis* too.

I shall begin with the *Joyned Worm* ; and shall pursue the Method I have already given, in more strictly considering those *particulars*, which I have laid down, to discriminate this from all other sorts of *Worms*. And the first is, it's being *flat* ; hence call'd *Lumbricus Latus*, and by *Hippocrates*, *tauvia* i. e. *Fascia*, and by some in English, the *Tape-worm*. — This flatness of the body, sufficiently distinguishes it from the others, which are usually bred in the body ; and are either short, and small, and then called *Ascarides* ; or longer, as the *Teretes* ; which are so

called *ερτ' εξοχίν*, tho the former likewise, are *round* too. Nor is there any out of the body that I know off, that are thus *flat*. *Spigelius* (a) observed one *digitum minimum latum*. So *Platensis* makes that, which he observed to be as broad as his finger. So *Marcellus Donatus* (b) in a Barber at *Padua*, saw it *digitali latitudine*. Some compare it, to the bigness of a Child's finger. (c) *Philibert Sarazenus* saw them *digiti mediū latitudinem æquantes*. The breadth of this Worm is various; both in the several parts of the body of the same Worm; as also in one Worm, compared with any other. The longer the Worm is, the broader usually are the latter Joynts. That of (d) *Gul. Fabricius Hildanus* was *grana Sex latus*; and because this, and that other of *Spigelius*, are often referred to; I shall here give a part of the * figures of both of them.

Fig. 7, 8.

2. The second particular I observed was its Joynts. From these large *incisures* of the body, a great number, or genus of Animals, have the name of *Insects*. In *Earth-Worms*, *Leeches*, &c. The *Annuli*, which make up the length of the body, are very remarkable; but much different from those in our present Subject; they being more proportionate to one another; and not of so unequal a length. And in the *Teretes*, and *Ascarides* the surface of the body, seems more even, and smooth; and not divided after this manner. These Joynts are so set on, that the lines or extream edges of the former, come over the later; which is to be well observed, and may direct us to that part or extream, where we may suppose the head to be placed. These edges of the former Joynt, which shoots over the later, in some I have observed to be plain; and smooth; in others crenated, and indented; in all, by

(a) *Spigel. de Lumbrico Latop.* 12.(b) *Mar. Donatus de Medic. Hist. mirab.* 1. 4. c. 26. apud *Hildanus* cent.(c) *Apud Hildanum Cent.* 2. Obs. 71.(d) *Obs. chirurg. Cent.* 2. Obs. 70. 19240. to a coppery hollow

drawing

drawing it through ones fingers from the Tayle to the head, you will find a great roughness; but if the other way, from the head to the tail, it seems smooth.

3. Many, who have observed this *Worm*, do take notice of the difference of it's *extreams*; how much larger one is than the other; but not well considering the setting on of the *Joynts*, abundance have been misled into an error, by taking the *Head* for the *Tail*: and so have either mist of observing; or miserably mistaken in the describing the *Head*. Thus *Spigelius* (e) makes the slenderer part of the body to be the *Tail*; but confesses he could never observe the *head*, nor was he likely where he looked for it. *Amatus Lusitanus* (f) makes the *head* to be white, and *Verrucosum*, thence the body, he saith proceeded broad, and grew narrower towards the *Tails*, which does sufficiently shew his mistake; which I must needs take it to be; for in all I have hitherto observed, I constantly found that extream where the *Head* is set on (if we may allow it to have any) much smaller than the other; sometimes not half a quarter so broad; in others lesser or greater, often according to the length of the *Worm*; But in all I take notice, if they are of any considerable length, that the *Joynts* towards the *head* are vastly shorter, than towards the tail. For in † one I have by me 24 foot long, there about five *Joynts* make an Inch; whereas the latter *Joynts* here are above an Inch long; but in some I have taken out of dogs, there were 30 or 40, sometimes above 60 *Anniuli*, which towards the *Head*, did make up but the length of an Inch; whereas towards the *Tail* 6 or 7 *Joynts* did equal that measure and sometimes 3, so that gradually the *Joynts* seem to encrease both in length, and wideness, as they approach the *Tail*. But withall it must be observed, that according to the Corrugation or exten-

(e) *De Lumbrico Lato* cap. 5. p. 12.

(f) *Chrat. Medic. Cent.* 6. *Chrat.* 74.

sion of these Joynts, their dimensions will be altered; which is most apparent in them when alive. That likewise there is a great difference of these Joynts in the various Species of this Worm; for I think there are more sorts than one. And as to the differences of them there are these I have taken notice of. 1. That in most the Joynts gradually, and very sensibly encrease in length. But in a vast quantity of this Worm voided by a person here in Town, but in several pieces, 2, 3, 4, or more or fewer yards long; I observed for a great length the Joynts much the same; but suppose I saw here neither the head, nor Tail. 2. In some those *orifices*, which I take for *mouths*, were placed about the middle of the Joynts, on the *Edges*; in others, about the middle of the flat of the Worm, near the Joyntings. 3. These juttings, or lips of the upper Joynts, over the lower in some, were plain; in others crenated; in others, the great protuberatings at the side rendered the the whole Worm serrated. 4. Usually the same Joynt is much of a bigness throughout; but the upper extream something lesser than the lower. But in one I took out of a Dog, I observed that towards the Tail, the upper part of the Joynt, by which twas fastened to the foregoing Joynt, was very slender; in the middle broad; and towards the other extream grew Taper again; so that it did well enough resemble the || figure, which (g) Cornel Gemma || Fig. 9. has given of it; and is borrowed, and Copyed from him, by Aldroviaudus, Spigelius, Sennertus, and others. Not that the whole Worm, as he has made it, was so; but one-ly some of the last Joynts. And in another I took out of the same Dog I could not observe the same thing; as neither did I in a third, I took out of another Dog, which was about two yards long; whereas these were each but about a foot or foot and half long; And this leads me to consider

(g) Corn. Gemma lib. de occultis Nat. Characterismis.

the

the fourth particular, I have proposed, the great length of this Worm.

4. Alexander (^h) Trallianus in his Epistle to Theodorus, tells us, 'tis sometimes as long as all the Guts, εἰ δὲ πλατεῖαι τοῖς ποστοῖς ἔκειται μέγεθος, ἀλλὰ καὶ διὰ συμπαρεκτείνεται πῶς ἐντίπειρ not that it lies extended streight the length of the Guts ; as those might think, who fondly imagined 'twas nothing else but a Mucous skin, or *spolium* of the same : But it lies convoluted in several places ; so that it often vastly exceeds the whole length of the Guts themselves. Thus (ⁱ) Pliny remarks, that there are *intra hominem Tænie tricentum pedum, aliquando & plurimum*. Platerus observed one forty foot long.

Thaddaeus (^k) Dunus saw voided by a woman one piece of this Worm five yards long ; and another, above 20. yards long. Yet in neither he could observe either the Head or the Tail. So that it may be thought but some part of the Worm. But what (^l) Olaus Borrichius tells us is remarkable ; that a Patient of his, in a years time, has voided 800 foot of this sort of Worm ; but in several pieces ; and that 200 foot of it, he kept by him ; and that hitherto he has not met with the Head. For the Patient observed, that alwayes in the voiding it, he perceived it break off ; that he has not yet come to the end ; and still goes on in voiding the same. Which I could parallel with an instance of a person here in Town, once my Patient ; who has voided vast quantities of this Worm, for several years together ; but in several pieces, 2, 3, 4. Six or more yards long ; but all put together, would much exceed the length of that of Borrichius. (^m) *Tulpus* saith he shewed in the Anatomy Theater, 40. yards

(h) *Ad finem lib. Mercurialis de Morbis Puerorum.*

(i) *Plin. Nat. His. l. 21. cap. 33.*

(k) *Thadd. Miscel. Med. c. 15.*

(l) *Vid Barthol. Aft. Med. voi. 2. Obs. 47.*

(m) *Obs. Med. l. 2. c. 42. edit Amstel. an, 1652.*

of this Worm; which was voided by one, in two days time. So that, if we should compare this, with those Microscopical *Animalcula*, observed in *Semine Animalium*, which according to (n) *Lerwenhoeck's* computation, if they were placed head to tail a great many Thousands would scarce make the length of an Inch; (they being so small, ut judicem (saith he) *millena millia arenam grandorem magnitudine non æquatura:)* we shall find here a greater disproportion in bulk, of these *Animals* in the lesser World, than between the *Ant*, and *Elephant*, or any almost in the greater. And it may be, is the only instance in *Nature* of one that has no determinate bounds in it's growth; at least that is known. For to be at any certainty I think is very difficult; since when it comes to any considerable length by lying in several Clusters, or Convolutions in the Intestines; the descent of the *feces* especially being quickened by a Purge, will be apt to break part off; which yet still will live, and grow 'till quite carried out of the body. Besides I question whether all those pieces which are voided by the same person, may be allways reputed parts of the same Worm, or of different. Indeed (o) *Spigelius* spends a whole Chapter to prove *plures uno non nasci, nec in homine bis nasci notatum.* He quotes the Authority of (p) *Actuarius*, and gives his own reasons too, since nature allwayes makes fewest of those Animals, which are the largest; and those are also uniparous, not multiparous; and he thinks either the want of food, the straightness of the place, or the weakness of human Nature, not being able to bring them to perfection, and so great a length; will prevent the being of more than one. (q) *Hippocrates* or who so was the Author of that Book ascribed to him, asserts

(n) *Philosophical Transact.* No. 142. p. 1041, and 1044.

(o) *De Lumbric. Lato.* c. 10. p. 31.

(p) *Lib. I. Meth. c. 21.*

(q) *Hipp. de morib. lib. 4.*

that

that tis bred in the Child whilst yet in the Womb,<sup>πρέσβιτος
φίμων τῷ πατέρει τὸν μηλέντον εἶναι</sup>, and assignes his reason for it, why onely then ; and adds that it has been observed by Midwives, that upon giving Medicines to bring away the *Fæces* from new born Infants, they have brought away both the round, and flat Worms ; which if true, what he afterwards adds, sc. *Si non sponte exeat, vel expellatur Medicamentis, una cum homine confundere;* *Εγγελλαγνέων* here may be literally understood, in respect of the *Man*, as well as *Worm* ; Since they are observed very often, if not most frequently in grown persons, as also old men. As *Gabucinus* mentions one troubled with them, who was 56. years old ; which renders suspected the truth of this assertion : And *Spigelius* upon enquiry of the Midwives both in *Germany*, and *Italy*, could never be informed that they observed these Worms in new born Infants. But as to *Spigelius* his reasons, why there should be no more than one in the body at a time ; I shall onely give this answer, that upon dissection of a Dog I observed two entire ones ; but each not much above a foot long. So that that answer he gives to that observation of (r) *Forestus*, who mentions twelve voided at the same time ; that they were one-ly parts of the same Worm ; tho often it may be true, yet sometimes it may be otherwise ; Especially, where we see such prodigious quantities are voided of them. However this is undeniable, and must be allowed, that this Worm is vastly long, which plainly appears even by those pieces we see of them ; for besides the instances already given, (s) *Simon Schultzius* mentions one seven yards long, and another nine yards. (t) *Clusius* tells us that the Duke of *Austria's* Cook voided pieces of this Worm, 6, 12, and 15. yards long. (u) *Jacobus Oethaeus* measured one 18. yards long.

(r) *Forestus. Obs. lib. 21. Obs. 26.*

(s) *Miscellan. Curiosa Germ. vol. 3. Obs. 229.*

(t) *Clus. in Monard. lib. 3. Simpl. Medic.*

long. (u) Alexander Camerarius has seen them above twenty yards long. In the Palace at Tiguri is kept the figure of one 18. foot long : and abundance of more Instances I could give were it needful.

But I shall describe that piece of [†] one I have by me, voided by a young man about twenty years of age, upon the use of an *Emulsion* of the cold Seeds ; which is enough for some, who are admirers of that *Philosophy*, hence to extol and magnify the power of *Signatures*. But to pass by here the *Aetiology* of his cure, as also the *Pathology* of the Symptoms he was afflicted with before he voided it ; I shall onely take notice, that having dragged it from himself, not without some frightful apprehensions, that Guts, and all were coming out; he plainly perceived it alive, and to move ; and having put it in a wide mouthed glass ; it often endeavoured by raising it's body to get out ; but the cold water into which it was put afterwards soon killed it. I measured it, and found it 24. foot, or 8. yards long. In it I numbered 507. *Joyns*. It's colour was extream white, being surgid with Chyle ; it's body flat, about the thickness of half a Crown, where thickest ; and the Joyns towards the Tail about $\frac{1}{4}$ of an Inch broad ; those toward the head about $\frac{1}{4}$ as broad as those towards the Tail ; and here the Joyns were not $\frac{1}{4}$ of an Inch long, whereas those at the Tail were of a full Inch long, and something more, and from the head they seemed gradually to increase in length. The Joyns much of a wideness throughout ; and the jetting edges of the former over the later usually plain, and even ; unless where the contraction of the body had rendered them a little crimped. The flats of both sides, just alike ; and without any Spots, protuberances, or any think remarkable, which might distinguish them, or be observed, onely a smooth Superfice ; but about the middle of the edges of each Joyn I observed a protuberating

(v) *Lib. obs. propriar.*

Orifice.

Orifice, which would easily enough admit a Hogs Bristle, and was open, and apparent to the naked eye. These Orifices were placed for the most part alternately, in one Joynt on the right side, in the following on the left. But sometimes I have observed them in 2, more seldom in 3 succeeding Joynts of the same side; but never in one Joynt more than once. These Orifices (till such time as I am better informed) I take at present for so many mouths, and the reasons of this my present belief I shall give in what I am to discourse on in my 6th particular. But since I have here mentioned of what length they have been observed in man, I shall also add how long those were I have seen in Dogs. For tho' they are to be met with onely in the Animal Kingdom; yet in abundance of the Subjects of this, and those too of different Species, they are very frequent; In Fishes, as in the Pike, Whiting, Bleakes, Crabs, Herrings, &c. and upon this Score sometimes they prove a great damage to the Merchants, as (*) Platerus observes, they being forced to fling them away. In Bleakes in the Summer time, if you open those that leap and tumble on the water, from the torment they feel within; you shall almost constantly meet with this Worm which is a thing well known to our Watermen. In Oxen often they are observed likewise, not so much in Calves, but in Dogs very frequently; which (y) Platerus makes to be another sort of the *Tenia*, and calls it *Ligula*, and saith *is longitudine prioribus respondens minimè tamen latum, sed teres Lumbricorum instar, totoque ductu sibi simile*; and makes it *immobile*; all which are mistakes, as I shall presently shew. (z) Simon Schultzius mentions a lap Dog that in a short time voided nine yards of this Worm in several pieces.

I have oftentimes here seen them my self; but shall mention those onely I found in dissection; as I met with the

(x) Plater. Observ. Lib. 3. p. 891.

(y) Plater. Praxis Tom. 2. l. 2. c. 13.

(z) Miscel. curios. German. vol. 4. Obs. 120.

first time two. There was indeed another piece, which I take onely as broken off from one of the former, because here both *Extremes* were pretty large, and the *Joynts* throughout proportionably long. But in the two others the disproportion was very remarkable; For besides observing here their *heads* hispid or thick beset with *haires* or small spikes, which I shall afterwards describe; I took notice that this *extreme* if extended, was very slender; and when a little contracted, the *Joynts* so very small, that they were scarce discernable by the naked eye; but where I could better distinguish them, between 30 or 40 made the length of an Inch; but towards the other *Extreme* or *Tail*, in one four, in the other 6, or 7 *Joynts* made that length; One of these Worms was scarce a foot long; the other not a foot, and half.

In another Dog, I since dissected, I found *another *Worm*, with just the same *head*, but about five foot long; Towards the *head* in this 60 *Joynts* scarce made an Inch, but at the *Tail* about three did equal that space; and the *joynts* here were about a quarter of an Inch broad; and in the sides of the *Joynts* in this, I plainly perceived those *Orifices*, I at present call the *mouths*; and shall describe in my sixth particular. But as to the *Head*.

* Vid. Fig. 2.

5. The head of *Nile* does not seem to be more perplex'd, and obscure to the Antients, than that of this *Worm*, which has created as many Controversies among *Anatomists* of late, as that has with *Geographers* of old. And those too who have had the advantage of observing vast quantities of this *Worm*, after their most strict enquiries, and most diligent research thereinto, have at last been forced to confess, that they are still at a loss, and know nothing certain of it; and what they propose, they deliver rather as a conjecture at random, than any thing as an establisht truth. And many, as most of the Antients are utterly silent in it. ^a *Spigelius*

^a *Spigelius de lato Lumbrico c. 5. p. m. II.*

who has wrote a whole Book of it, and with the greatest accurateness of any before him ; yet tells us, after he had delivered the opinions of those before him, *ego autem quamquam nunquam caput videre potuerim, non levি ratione conijcio, huic esse parvum in acutum desinens, & rostratum, ut alijs lumbritis est*, and acquaints us that *Gabucinus* did seem to give it *rostrum acutum*, and to compare it to that of the *Acus marinus*. But as I shall shew in my last particular, 'twas *Gabucinus's* opinion that this *Worm* was nothing else than a *spolium of the Intestine*, which included the *Cucurbitini*, which gave it life and motion.

But in *Hippolitus Brillus*, who sometime before had wrote a book, *de Vermibus in Corpore humano genitis*, I find nothing besides Quotations, and they too nothing remarkable to our purpose. ^b *Amatus Lusitanus* makes it *Verrucosum et album ex quo Corpus latum procedebat, & quo magis ad caudam accedebat, eo strictius evadebat*. Which addition as I have observed destroyes the truth of his observation. ^c *Rondeletius* saith 'tis *longum, parvum, oculis destitutum*, and indeed what use of eyes it should have, I cannot see. So ^d *Forestus* observed it *in mucronem tanquam subulam desisse*. ^e *Welschius* thinking all this nothing, tells us that all before, observed these *Worms* to be *anopaei*, and that the first that discovered, and gave them a head was *Tulpius* ; and since that, *Jo Mich. Fehr.* I shall therefore give their observations of it ; and then deliver what I have observed my self.

Nic. Tulpius a noted Physician, and Burgomaster at *Amsterdam* in the former ^f Editions of his *Medical Observations* makes this *Worm* to be ** Biceps* ; and to have *two heads*, placed like the *Horns of a Snail*; not that he ob-

^b *Amat. Lusitan. Cent. 6. curat. 74.*

^c *Rondeletius lib. de dignosc. morb. c. 17.*

^d *Forestus Observ. lib. 26. c. 36.*

^e *Welschius de vena Medinensi cap. 4. p. 130. 131.*

^f *Anno 1651. 1652. &c.*

served it so himself, but had the relation of it, and figure, from *Henricus à Rügen* a Kinsman of *Augerius Clusius*, who voided it. But *asseverebat ipsus satis sancte inhabuisse illud ipsum Caput, quod exprimit figuram;* and he saith, *erat autem hoc Caput, ut breve, sic utique planum ac latum & ejusdem cum reliquo Corpore coloris:* one of the heads was broken off by the violent straining in the voiding. *Altero interim illæso, sed circa apicem summè villoso;* *attamen sine ullo oris hiatu,* quo dum caret, *quid verisimilius, quam ipsum ali solo suctu.* To this I shall add, what Job. Rhodius has delivered; which favours this opinion of a double head; where he tells us, that *Adrianus Spigelius* upon dissection of a *Lap-Dog* which dyed of an *Epilepsy* in the year 1622. that he found the Intestines full of this sort of Worms, *sed imprimis Latus Lumbricus ijs adhaesit, capite bifido, qui veram candidi coloris fasciam referebat,* but notwithstanding these Authorities, I shall still suspend my belief of these double heads till better Information. And indeed *Tulpus* himself seems to me to suspect the truth of the Observation, having in the last Edition of his Book wholly left it out; without taking any notice of it, and given another very different; and in the same figure, he has erased the former heads, and clapt on a * new one, to the old body; quite different from what was before; and that we might not mistrust ^{* Vid. Fig. 4.} this, he tells us that this head is *non fictum, aut pictum, sed genuinum, & prout id ipsum dum Corpori etiamnum inhæreret,* a Francisco Vicquio, Arnoldo Tholingio, alijsque quam plurimis Medicis coram conspectum, *idque non semel atque iterum, sed tertium, nam toties insectum hoc excrevit Uxor Gul. Smithij.* His description of it is very short. *Erat autem caput hoc non minus acutum, quam planum, & ore admodum exili, planè eadem formâ, quâ ejus Iconem, dum adhuc reperet, ari incidit Solomon Saverius artis ejus abunde peritus.* But by all I can see in his figures, I cant but think, he is at the wrong

g Job. Rhodij Obs. Med. Cent. I. Obs. 390.
Anno 1672.

end;

end ; for by considering the prominence of the Joynts, the placeing of it's spots, and difference of it's ends ; I should sooner by half look for it at the smalleſt extream which he makes the Tail, than the other where he has now placed it.

Jo. Michael Fehr a German Curioso in his Treatise de Hierā picrā sive de Absynthio in the year 1644. he obſerved in a piece voided by a Patient about 6. yards long, a head much different from that of *Tulpius* ; he describeth this Worm *cum collo sensim angustiore, & rotundiore in minutissimum capitulum atrum, & verrucosum, trium Papaveris seminum aptè conjunctorum formam exprimens, deſinentem; cuius iconem ob raritatem hic addidimus.* Indeed I must confess that account I had from the women who firſt obſerved it, and the Patient who voided that Worm I mentioned to have by me eight yards long ; and was given me by my worthy Friend Mr. *Houghton* an Apothecary, ſeemed agreeable to this, tho when I firſt ſaw it I could take no- tice of no ſuch thing ; and therefore am apt to think 'twas onely ſome Thrumbs of the inward coat of the Intestine, which might ſtick to the hooks here, which might make this figure. For in the heads of all I have had yet an opportunity of ſeeing ; I could never obſerve any ſuch thing.

I ſhall therefore now deliver my obſervations of the heads of this Worm as I have ſeen them, in three ſeveral ones I have taken out of the bodies of Dogs upon diſection ; and it being ſo, makes me to be ſomething more at a Certainty ; where I know I have them whole. And altho all three, did exactly agree ; yet there being ſome circum- ſtances, which attended the one, tho not the others ; yet being very material to our purpose, I ſhall recount them here. And it was in a Dog I opened at our private meetings, at the *Anatomical Theater of the Colledge of Physicians*, where I obſerved this Worm alive in the *Ilion* ; not lying ſtreight,

i *Jo. Mich. Febr de Hiera picra seu de Ab'synthio p. 125.*

but in many places winding, and doubling! Having taken notice how the Joyns were, I traced it up, by carefully opening the Intestine, to the smallest Extream; where I expected the head to be; and which didly towards the *Duodenum*; whereas the broader end was downward towards the *Rectum*; and this broad end was free, and did nothing adhere; whereas that smaller extream did so firmly stick, and had fasten'd it self to the inward coat of the Intestine, that it was not without some trouble, by gently raising it with my Nail, that I freed it from it's adhesion. Having lifted it up, I carefully viewed it; and did observe neither that *Biceps* in *Tulpia's* first figure, nor the head like a *Tricoccos* as in *Mich. Febr.*, but a very slender body; which being alive, it would sometimes shoot out a considerable length; at others retract it in again, and so very much alter it's figure, by becoming *broader*. But whilst I was doing this, by it's wrigling it's body, it happening to fall off my finger; it presently took hold again, and gave me as much trouble to free it a second time from it's adhesion, as at the first. Other observations I then made of it's motion, and of the two single Joyns which were broken off, which I shall mention in my last particular: as also of those *Orifices* at the sides, which I shall discourse of in my next; and for the present I put it into Spirit of Wine, that I might more carefully view it with a *Microscope* at home. And in doing this, making use of some extraordinary good ones, it very plainly appeared as is represented in my *11th* *Figure*, thick beset with two orders of *spikes*, or *Hooks*, whereof the larger did arise from the Center or Middle, spreading themselvs over the edges of the circumference; the other which were lesser issuing out about the middle from the Center, and were shorter, as is seen in this *Figure*, and are represented sideways in the *twelfth*. I could not upon my strictest Enquiry, and with extraordinary Glasses too, inform my self of any *Orifice* here, which we may suppose to be the *mouth*; onely a little indenting there was,

in

in the Center, occasion'd by the issuing out of the Spikes thence. This end was not perfectly flat, but a little globous, and I could perceive by the swelling a little below on the neck, and wrinkling of the Skin, as in the Figures how it did shoot out, and contract it's neck, as I observed it when alive: For some little space here, I could not observe with the glasses any Joyns at all; but after, very thick set, and small, and gradually increasing in length, as they descended towards the Tail.

The heads of the other two Worms exactly appeared the same in the Microscope, as this described. And afterwards by carefully viewing them by my naked eye, I could observe these hairs or Spikes. What therefore Tulpus saith in his first Observation of this Worm, of the head that was entire, and not broken (and I am pretty confident was the onely one it had) that it was *circa apicem summe villosum, attamen sine ullo oris hiatu,* is true enough. And that passage in *Spigelius*, who having given the different opinions of others concerning the head of this Worm, adds, *a multis verò creditur caput esse exiguum cum paucis quibusdam pedibus more aranearum,* must be understood of the Spikes, we have described, and will hold good; tho' it seems not much regarded by him.

It was objected by some ingenious persons, who had been acquainted with what I observed concerning this head, whether these spikes, or hairs might not be like the small feet of the Tick or *Ricinus* for it's fastening it self the better to help it's suction. And indeed were it blood it lived upon, the case were plain; but since 'tis Chyle what service they could do it in this, I do not see; for when they fasten, the head is deep immerged in the inward Coat of the Intestine; and so may be thought for that time, to get but a very inconsiderable sopor, if any; and nothing in proportion to what is requisite for so vast a long body; and what it is often observed to be turgid with. Upon the whole, what seems most agreeable to me, and to be the true use of this

part we call the *head* is this ; that by the means of these *books*, and *Spikes* it might fasten it self, and so prevent it's too easy *ejection* out of the body. For it being so very long, and large too, and it's body in many places winding, and *convoluted*, the descent of the *faces* upon all occasions would be apt to carry it out with them ; had it not this hold, which is so fast, that rather than loosen it self, parts of the body are sooner broken off, which we frequently see in the stool. When it penetrates the coat of the Intestine it contracts it's *books* in, and draws up it's head to a point ; then expands them, and takes firm hold of the Membrane, by darting it's several *poniards* into it ; which excites those intolerable *pains*, which those that are troubled with them, so much complain off ; that I have known it to that extremity, that some have been scarce dissuaded from offering violence to themselvs, to free themselves, as they thought, from a great misery, and hence it is that this Worm is of so difficult *a cure* ; that tho by Medicines, and Purges, vast quantities at times may be brought away ; yet some can hardly get a perfect cure all their life time ; as I know of one who for above twenty years has been afflicted with it ; that has had the advice of several able, and eminent Physicians. And indeed all, who have wrote of this Worm, do make rhe same *Prognostick* of it ; that the *Story* of *Hippys Rbeginus* in *Ælian* is not insignificant, where he tells us ; that a Woman being troubled with this *Worm*, and the most skilful Physicians despairing of helping her ; she went at last for a cure to the Temple of *Aesculapius* at *Epidaurus* ; but the *God* being absent, his *Servants* there advised her to sit in the place, where he used to do his *Cures* ; and then cutting off her head, one of them thrusting his hand into her belly, pulled out a huge *Worm*, and then endeavoured to place her head on again, but could not ; but the *God* by this time being returned, he severely check't them, for

rashly attempting what *Art* nor *Human power* was able to do ; and having set it on himself, he dismiss the woman perfectly cured : But since in this head we find no mouth ; we must seek it somewhere else, and I come now to discourse of it, which is my sixth *Particular*.

I am very sensible with how great difficulty my present thoughts concerning this will be received ; how obvious to all 'twill be to raise objections ; and how liable I am to the censure of many of a long Magot, in proposing so many *mouths*. But before they pass too severe a sentence on me ; I would let them know, how little 'obstinate I am in any *Hypothesis* of Philosophy ; how mistrustful of my own eyes where I have reason to think, that others are quicker sighted. And a notion tho never so fondly received at first, yet is as easily repudiated by me, upon better information. What I here offer if true, others will find it likewise ; if not, I think my self as little obliged as any of them, to believe it. But why at present I think those *Orifices* in every Joynt to be so many *mouths*, I shall now give my Reasons.

I have already observed them to be of *two sorts* ; that in several Worms both from human bodies, as also in those of *Brute Animals* ; they are placed much about the middle of the Joynts on the *edges* ; most frequently alternately, in one joyn't on the right hand, in the other on the left, sometimes in two, seldom in more on the same side ; they are protuberant something like a * *Papilla* and in the middle a *foramen* easily enough to be perceived by the naked eye, and will readily admit a Hogs bristle. In the other sort, these protuberances are placed about the middle of the *flat* of the Worm, towards the upper part of the Joynt, and seem to be represented by *Spigelius*, *Sennertus*, and *Tulpus* in their figures of this Worm ; tho with some mistakes ; and is that, which *Authors* mean by their *macula nigricantes* in their descriptions of it. ¹ *Olaus Borrichius*

Vid. Fig. 10.

¹ *Bartholin. Acta Med. vol. 2. Obs. 47.*

observed here sometimes three, sometimes more; non nunquam eadem sexangula.

At present I shall chiefly insist upon the former sort, which has occurred most commonly to me: And a short black *line* here, placed transverse to the body, I think was the first that gave me notice of them; Tho' since in others, I have not so constantly seen it; but onely a protuberant *Orifice* about the middle of the edges of the *Joynts*. These protuberances by ^mFranciscus Sanchez in the || figure of that part of this *Worm*, 16 foot long, which he gives us, are plainly represented; but he does not describe them or take any notice of the *Ostia*, or *Foramina* in them. But that they are so many *mouths*, I shall argue, First, from the great quantity of *Chyle* they are often turgid with. Secondly, from the great *Appetite*, but more often *Thirst*, but almost always that *Emaciation* which they occasion. Thirdly, that there is no other *mouth* besides observed. Fourthly, that no *uses* can so fitly be assigned to these *Orifices* as their being *mouths*.

As to the first, none, who have observed them, but must confess that they are often very *turgid*; as that I have by me eight yards long, at first did very plainly appear; and having put it into *Spirit of Wine*, I found after a little while it had muddied it, by spewing out a large quantity of a *Chylous juice*; which made a deep sediment at the bottom; as likewise it did a second time, having changed the old, and put it in fresh *Spirits*. Whence all this should issue, I cannot see, but by these *Orifices* at the sides; which first I supposed had received, and licked it in. And being in so large a quantity how otherwise could it be well received into the body; but by these many *mouths*; which being always open, and lying of all sides too, do greedily exhaust, and devour the best part of the *Chyle*, and nutritious

|| Vid. Fig. 6.

^m Fr. Sanchez de morbis internis. l. 3. c. 14. p. 131.

aliment.

aliment. That hence may be well accounted for, that *Appetitus Caninus*, that great *Thirst*, that *Atrophy* I mention in my second particular, and are often observed in those, that are afflicted with this *Worm*. Indeed • *Spigelius* thinks this *Boulamy*, and *Atrophy* are occasioned not so much by the Worms devouring the *Chyle*, as 1. Corrupting it, 2. Hindring it's distribution by occluding the Meseraick veins. 3. By it's creating a false sense by the motion in the Guts. All which reasons do nothing move me. And • *Galen* is express that it is by devouring the Nourishment, and so is • *Aetius*, and twenty more, that I could name. • But had they but one mouth how could they do this? But having as many, it may be as the *Lacteals* themselvs; 'tis no wonder that they rob them, and by their nimble supping it up, prevent it's passing into them. That thence we must necessarily expect an extenuation of our own bodies in proportion to the increase of theirs; since the nourishment we receive is but what they leave us; and that too none of the best; and corrupted likewise with their recrements. 3. I argue that these *Orifices* are so many mouths; for if we do not admit them to be such, I know not where in the whole body to find them besides. For in that part we call the head, even our *Microscopes*, as I have observed, cannot discover any; and those too, that guessed it to be there; they all acknowledged it to be very small, and it being so, and but single too; I cannot see, how it can take in so great a quantity of *Chyle*, which would be necessary for maintaining so great a body of so great a length: For it can only lick up no more, than what just comes in it's way; that the open mouths of the numerous *Lacteals*, would be too hard for it; and quickly starve it. Besides since it nuzles its head so deep in the Coats of the Intestines,

n De Lumbricolo c. 5. p. 50.

o Gal. lib. de Theriaca ad Piserem.

p Aet. lib. 9. c. 40.

at that time at least it may be thought incapable of getting scarce any thing at all : But the use I have assigned that part I am apt to think will satisfy others, as well as at present it does my self." Therefore 4. Why I think those *Orifices mouths* is, because I cannot think what they are besides. For to take them for so many *Vents* of their excrement, would be more unreasonable ; since 'tis pure *Chyle*, which they receive ; which will not afford much, at least so gross an *excrement*, as to need so many, and large *Orifices* for the voiding it. And why so many *Anus's*, when but one *mouth*? Tis easier to imagin them *Bronchiæ* or *Lungs*; which in *Insects* are observed in all the *Annuli*, or *Joynts* of the body ; but withal I must observe, with how much difference from our subject. For in them, you shall constantly see these *Orifices* of both sides in each *Annulus* ; but in our Worm never but of one side : In those, they are not near so open, and large, as in this Worm, even so much, that I cannot see, how it can be avoided, but that the *Chyle* must slip into them ; and so spoil them for being *Lungs*.

And indeed what use can we imagin of such here, which must almost constantly be occluded, either by filth or *Chyle*. If I misremember not, by pressing them gently with my fingers when fresh, and turgid, I observed *Chyle* to issue out of them. ^q *Philip. Salmuthus* seems to hint so much where he tells us *lactei quid emisisse observavit*, and ^r *Olaus Borrichius* observed them *semper liquore crassiusculo plena*, so that that chylous *Sediment* in the *Spirit of Wine* I had immersed them into, came hence, I think I have little reason to doubt.

Upon the whole, what I have here offered, I think is sufficient to render my conjecture probable. And yet I have more reason to add why these *Orifices* should be

^q *Salmuth. Cent. 1. Obs. 95.*

^r *Apud Bartholin. Acta Med. vol. 2. Obs. 47.*

mouths ; because the Joynts when broken off, yet still do live ; and that too, as may be thought for some considerable time ; which they could not, unless they had mouths in each ; which might receive the aliment for the support of it. Which brings me to the *last particular*, I proposed for the discriminating this *Worm*, from all others out of the body, and shall now discourse of. But since it has been so stiffly maintained by *Authors* of great note both *modern* as well as the *Antients* ; that the *Worm* it self scarce lives ; but is onely a *Spolium* of the *Intestine*, or at least it is not one but many *Worms*, included in that *Membrane* ; I shall consider how unlikely all such Opinions are, and wide of the truth ; and then deliver my own Observations of it.

^f Hippocrates, or who so was the Author of that Book, amongst his Works, tells us that this *Worm* is οὐδέποτε ἐντέρου ξύσμα νεύκης, *quasi album ramentum Intestinorum*. And Aetius, and Paulus Egineta are express that 'tis onely the inward Coat of the *Intestine* turned, and changed into the figure of an *Animal* ; and many more are of the same Opinion not worth mentioning ; it seeming so absurd, as ^t Mercurialis observes. He rather thinks it to be the *Mucus*, which lines the insides of the *Intestines*, and defends them from any asperities of the *faeces*. And abundance there are of this opinion. But ^x Franciscus Valleriola seems the most of any, to play the *Philosopher*'s, and labours to shew, how this *Pituita* of the *Guts*, may be formed into a *Membrane*, and then endeavours to account for (*sed Dis invitis*) how these Incisures, or jointings of the body, might happen likewise. ^x Felix Platerus is very positive, that they are no *Animals* at all ; that they have no motion, *Sed ex unī tantum crassā, albā, mucosā membra-*

^f Hipp. l. 4. de morbis.

^t Mercurial. de morb. pueror. lib. 3. c. 7.

^v Valleriol. obs. Med. l. 1. obs. 9.

^x Plater. obs. lib. 3. p. 891.

hâ constantes, and that they are *Ligulae, fasciæve membranæ ex Chylogenie.* But those many Physitians, who have observed it to move, and therefore to be an *Animal*, and alive; do easily confute him, as *Gabucinus* mentions one voided by a Child two years, and four months old; that being put into water lived almost a day. And a remarkable instance I had of it, in † that I met with upon ^{Vid. Fig. 2d} dissection of a Dog in the *Theater* of our *Colledge*; where several of the Members were present. I shall therefore mention what particularly I observed of it; and the mannerhow it did perform it; which was very pleasing; and in different forms. For tho all was performed by contracting, and shortning the *Joynts*; yet sometimes it rendered the body that was flat, round, and a Cylinder; other times it made a deep hollow or concave, on one side, and a Convex on the other; but most times there was a bellying out at the edges, about the middle of the *Joynts*; and tho that part towards the *head* was very slender; yet upon Contraction it would become as broad as the last *Joynts*. This contraction of the *Joynts* I sometimes observed, at several places at the same time, at some distance from one another; which must needs much advantage it's progressive motion: since being of so great a length, otherwise it could make but small advance; which is perhaps requisite, that it might recover it self, when the descent of the *Fæces* do drive it downwards. And for the advantage too of it's motion; at every *Joynt* there is a prominence of the former, over the later; which like so many Scales on the belly of other *Reptiles* do perform the use of *Feet*.

But I find that those who admit this *Worm* to be alive, have several of them very different thoughts of it; and many there are, who do assert, that 'tis not one, but

many Worms, linked together. Thus • Antonius Benvenius gives an History of a Woman, who upon drinking the Bath-waters of Avignon, voided several *Vermes Cucurbitinos*, qui ita interfuse (dum sc. alter alteri mordicus inhæret) jungebantur, ut cum sua ipsi serie quatuor Cubitorum longitudinem excederent, unum tantum Corpus, unum dñntaxat vermem putares. So • Aldrovandus judges it: ex multis, si longus fuerit, vermis, Semini Cucurbitæ similibus, sibique invicem arête coadunatis, constitui. Arnoldus • Villanova-nus mentions that it was the opinion of some, quod isti Cucurbitini generantur in ventre cuiusdam maximi Lumbricis, qui aliquando emititur longior uno, vel duobus brachij. And Morardes tells us how that in a large Worm were observed abundance of these Cucurbitini. And this • Hieron. Gabucinus delivers as his opinion, where he tells us, ego vero nil aliud latum Lumbricini esse existimo, quam, ut inquit Hippocr. abrasionem veluti Intestinorum album tota complectentem intestina, intra quam Cucurbitæ semini similes animantes procreantur, & quidem vitam sensilem viventes. And a little after he adds, si quis vero totam illam abrasionem animatum viderit, sciāt non abrasionem illam, id est latum vocatum Lumbricum, sed Cucumeris similes Animantes intra ipsum vivere; He all along denies the *Lumbricus Latus* i. e. that Spolium of the Intestines, as he calls it, to be an Animal; but that it receives all it's sense, and motion from those Cucurbitini included in it. This he very plainly, as he tells us, discovered in a part of this Worm, shewed him by a person, that voided it. His Words because the Book is not very common, I shall mention. Hæc autem portio sepe commovebat, quo factum est, ut avidius motus ipsius causam vestigarem; diligentissime tandem perquirens per ejus totam cavitatem Cuc.

(z) Beniv. Exempl. Med. observ. 87. p. m. 277.

(a) Vlyss. Aldrovand. de Insestis lib. 6. p. m. 651.

(b) Arnold. Villanov. Brev. lib. 2. cap. 21. p. m. 1229.

(c) Galuc. de Lumbr. aluum occupantib. Conent. c. 3. p. m. 34.

meris similiū Animalium seriem sese moventium, ipsi motum
præstare conspexi : quæ ex ea veluti ex quodam lectulo prodibant,
interdum unum, duo simul interdum complicata, plerunq; quatuor
plurave : atq; eam abrasionis portionem, quæ vacua ab hismodi
Cucurbitini segmentis animatis erat, nullo pacto moveri, imos-
fidere. Which last particular if it was so, is something re-
markable to his purpose ; but I very much suspect it ; be-
cause in that I met with in a Dog in the Colledge Theater,
whilst alive, and in my hand, a joyn or two fell off ; but I
could no waies obserue any Membrane hanging to the fore-
going joyn, out of which it might slip, but it broke off
entire. And altho there were two Single Joynts. which I
found in the Intestin, upon the first opening it, yet there
was nothing I could see affixt to the last, which might in-
clude them. And indeed the setting on of the Joynts here is
such, that seems to me sufficiently to shew, That this
Worm cannot be a continued membrane, articulated only by
the several *Cucurbitini* included in it, since there is so large
a protuberance of the lower Extreme of the foregoing
joyn, over the upper part of the following ; which I
plainly perceived in this Worm. If only a Membrane, why
constantly, and thus regularly a difference of both extremes,
as to their length and breadth ? How happen the hooks at the
head ? How are those orifices formed at the Edges, or on the
Flat of the Worm ? And if it was so, as *Gabucinus* imagi-
ned, I cannot think but I must have perceived something
of it, in those several peices of this Worm, which I have
obserued : and especially in that eight Yards long, where
I opened several joynts, and could find no such thing.
That Mucous matter therefore , which is observed to be
voided, by those, troubled with them ; which he tell us the
women there, take for the beds of this Worm, may be bet-
ter accounted for ; it being likely in a great measure to be
but the *Mucus* of the Intestines themselves, or a slimy *Spo-*
lium cast off from these Worms. Thus *Leeches* I have ob-
serued being put into water, do cast out a slime, which co-
vers

vers their body's, which afterwards they slip off, and is found in the bottome of the Glass in the form of a mucous Coat. So *Earth-Worms* do void a large quantity of a mucous liquor, at several parts of their body ; so *Snailes*, &c. of which more in my *Anatomy* of those *Animals*. Upon the whole, I see nothing why we may not justly ascribe that life, we find here, to the *Lumbricus Latus* it self, and not to any *Animals*, we may fancy it pregnant with. And what I do give to the *Whole*, I must attribute likewise to the several *parts* of it, even when separated from the rest of the body ; and can't but think that they do live likewise. Not that I think those *Cucurbitini*, are to be reckoned as the *partus* of the *Latus* ; which that passage, in ^d Aristotle seems to intimate, where he tells us that it does *αποτίνεται διο τον σκύλον σωρόμα*, *aliquid simile semini Cucurbitae parit.* For Hippocrates denyes this of the *Latus*, tho he does allow it to the *Teretes* ; where he saith *καὶ αὐτῷ σημα-γόλαχον τίτασιν; οὐδὲ μάλιστα ἐπέτι.* Neither likewise are they to be thought a fourth *species* of Worms ; as many would have it.

But they are onely the *Joynts* or *pieces* broken off from the *Latus*, and when they are voided in the *Stools*, are a sure sign of a *Joynted Worm*. And the *cure* must accordingly be adapted. But that all these single *Joynts* whilst in the body do *live*, besides those considerations I have already delivered to prove that in every *joynt* there is a mouth for receiving the food ; and no doubt answerable Organs for the digestion, and distribution of it ; so I am the farther induced to believe it ; because it has been often observed by my self, and others ; that both single *Joynts*, and of tener larger pieces have been voided alive ; and where vast quantities of this *Worm* too have been voided at the same time ; in abundance of pieces, I have observed them

^d Arist. hist. Anim. lib. 5. c. 19.

e Hipp. lib. 4. de morbis.

almost equally turgid, and alike filled with Chyle in proportion to the magnitude of the parts. Now I cannot think that in voiding it can always be broken into so many pieces; and if it be done sometime before, and they lye dead in the body; they must be emacerated, and different from what they appear. But that observation, I have already often mentioned of that *Worm*, I met with in the Dog, I dissected in the *Colledge Theater*; does furnish me with something apposite to our purpose. For hereabout the middle of the *Worm*, as it lay in the Intestine about a foot and a half from the *Tayle*, or lower Extream, I observed two single *Joynts*, about $\frac{1}{2}$ of an Inch long; alive, and which continued their motion briskly for $\frac{1}{4}$ of an hour, or more in warm water. That these were broken off from the *Tayle* I nothing question; being in all respects so like them. And that it must be done sometime before, I am apt to think, because they were so remote from it. For they could not otherwise easily, being but single *Joynts*, make so great an advance, being upon all occasions liable rather to be driven down, not being able as I could observe any ways to fasten themselvs, and so resist the force of the descending *Fæces*. Which is the reason when broken off, they are so frequently voided.

Upon the whole I have been sometimes apt to think, what *Analogy* there may be between this *Joynted Worm*, and *knotted Plants*; of which each *Joynt* can so easily propagate its self. And whether it may not be thought an *Animal Plant-Animal* or *Zoophyton* bred in *Animal* bodies, since so large, and frequent *detruncations* of the body, does not destroy the life of the whole. Which I think can scarce be instanced in any *Animal* besides.

But my *design* here, is not the raising of any *Hypothesis*, but the enquiring into the truth of those of others. It being much easier to spy others faults, than to avoid them our selvs. In what I have said I have done the former; but

but can no ways secure my self as to the latter. But in the whole, if I have not hit the mark; I have fairly aimed for it, and it may be some help, and direction to others in prosecution of this subject. And what I have laid down I think I have made out, how different this sort of *Worms* bred in *Animal body's*, is from all others hitherto observed out of it; from whence or any *Seminal matter* of it, it may be supposed to be propogated.

And how strange soever what I have here related of the head; of the many mouths; of the great length; and other particulars of this *Worm* may seem to others; who will be presently apt to censure it, as Romance, and Fable; I shall onely add that Saying of ^f Pliny, *Mihi contuenti se persuasit Rerum Natura, nihil incredibile existimare de eâ.*

The Anatomy of the *Lumbricus Teres* or Round Worm will be given in a following Transaction by the same learned Person.

^f *Plin. lib. 11. c. 3.*

THE

EXPLANATION OF THE FIGURES.

FIGURE I.

R E presents that *Worm*, or rather part of a Worm, voided by a young man in *London*; which was eight yards long, which I still keep by me. The *lesser extreme*, is that part towards the the *Head*; the *broader*, the *Tail*. The *Protuberances* about the middle of the edges of the *Joyns*, are the *Orifices* I take for *Mouths*.

FIGURE II.

Represents that *Worm* I took out of a Dog I dissected in the Colledge *Theater*, which was about 5 foot long; and was alive. The *small End* shews the *head*; as it appeared then to the naked Eye; and is represented magnified by the *Microscope* in the 11, and 12 Figures. The *Protuberances* at the sides, are the *Mouths*. The *broad End*, the *Tayle*, as in the first Figure.

Figure 3, 4, 5, represents the *figures* of the *Head* of this *Worm*, which are given us by *Nich. Tulpus*; and *Jo. Mich. Fehr*.

FIG.

FIGURE III.

Represents the two Heads, which *Tulpius* in the former Edition of his *Observations*, gave to this *Worm*, where he makes it a *Biceps*.

FIGURE IV.

Is the Picture of the Head of this *Worm* which *Tulpius* gives us in the latter Edition of his Book of *Observations*.

FIGURE V.

Shews the Head of this *Worm*, as tis delineated by *Jo. Mich. Fehr.* which appears like a *Tricoccus*.

FIGURE VI.

This Figure I met with in *Franc. Sanchez* which tho' rude and plain, yet very well represents those Orifices which I take for the several Mouths of this *Worm*.

The Figures 7 and 8 are those of *Adrian Spigelius*, and *Gul. Fabricius Hildanus*; where the Mouths seem to be placed on the flat, not in the Edges of the *Worm*, I have observed them so in some, but those by me, being dry and so not fit for an accurate draught, for the present I have made use of these.

FIGURE VII.

A piece of this *Worm* as delineated by *Spigelius*,

FIGURE VIII.

A part of the same *Worm* as tis Pictured by *Fabricius Hildanus*.

FIGURE IX.

Is the Figure of this Worm in *Cornel Gemma*.
 The following Figures represent parts of this Worm, as viewed by the Microscope.

FIGURE X.

Represents the Protuberance or *Papilla* about the middle of the Edges; and in it the *Orifice*; which I take for the Mouth of this Worm.

FIGURE XI.

Is the Head of this Worm as it appeared in the Microscope, in three several ones I took out of the body, upon *dissection*, wherein is observable, a double order of Spikes or *Hooks*; the longer arising from the *Center*; the other more towards the edges, which at pleasure it can contract in, or protrude, and with them, part of the *Neck* too, as does appear by swelling out a little below, as it is very curiously delineated, as likewise the other figures, by my most ingenious Friend and accomplish'd Gent. Rich. Waller Equire.

FIGURE XII.

Is a side prospect of the Head and the *Hooks* in it, of the same Worm.

OBSER-

OBSERVATIONES

ECLIPSIS LUNÆ

Die $\frac{11}{21}$ Februar. post Meridiem.

	Parisiis.			Hafniae.		
	In Observatorio Regio.			In Collegio Claromontano.		
	A D ^o . Caffino	A D. D. Picard, & De la Hire	A R. P. de Fonteney.	A D. Roemer reductione Meridianorum facta subir. 41°. 40''. pridem Observationibus Jovialium reperta a D. Picard.		
	h.	l.	ll.	h.	l.	ll.
	h.	l.	ll.	h.	l.	ll.
Initium						
'Arifarchus medius	9.	20.	55	9.	21.	58
Medium Copernici	9.	29.	57	9.	29.	33
Initium Tychonis	9.	38.	45	9.	38.	25
Finis Tychonis	9.	45.	52	9.	45.	48
Initium Platonis	9.	47.	40	9.	47.	36
Centrum Luna	9.	49.	47	9.	49.	08
Centrum ex Comparatione Initii & Finis				9.	51.	10
Manilius medius	9.	50.	24	9.	50.	44
Menelaus	9.	53.	16	9.	53.	30
Dionysius	9.	56.	43	9.	56.	20
Promontorium acutum	9.	57.	09	9.	57.	40
Initium Caspiae	10.	04.	31	10.	04.	15
Finis Caspiae	10.	11.	40	10.	11.	25
Luna penitus immersa.	10.	16.	27	10.	16.	30
	10.	19.	53	10.	19.	30
Initium Emers. Grimaldi inter & Galilei	11.	57.	51	11.	56.	00
'Arifarchus medius	12.	02.	00	12.	01.	55
Medium Platonis	12.	12.	06	12.	12.	10
Medium Copernici	12.	14.	32	12.	14.	30
Medium Tychonis	12.	22.	35	12.	23.	55
Centrum Luna				12.	25.	50
Centrum ex Comparatione Emers. Limborum	12.	26.	09	12.	25.	15
Manilius medius	12.	26.	22	12.	26.	08
Menelaus medius	12.	29.	08	12.	29.	20
Dionysius	12.	32.	30	12.	33.	15
Promontorium acutum	12.	39.	45	12.	39.	50
Initium Caspiae	12.	41.	53	12.	41.	30
Finis Caspiae	12.	47.	15	12.	46.	30
Finis Eclipsis	12.	54.	27	12.	54.	30
				12.	54.	17
						V
						Eclipsis

*ECLIPSIS LUNÆ Totalis cum morâ,
Anno 1682, die 21 & 22 Feb. vesp. & mane st. n.*

*OBSERVATA GEDANI
à J. O. H. HEVELIO.*

Tempus sec. horol. ambul.	Ordo phaeum.	Digitii Eclipt.	Altitudines Stellarum.	Per quas Maculas transverint umbræ Sectiones, et quæ insuper notata fuerint	Tempus ex alit. Correto.
h. 1. 11.			Palilicui 39° 53'		h. 1. 11.
3 41 18			Palilicui 39° 27		8 40 46
8 44 9			Palilicui 39° 0		8 44 20
8 48 14					8 47 59
10 8 28				Initium penumbræ dilutissimæ	10 9 0
10 12 50				Penumbra densior	10 13 20
10 19 5				Penumbra adhuc crassior	10 19 36
10 23 50				Penumbra densissima	10 24 24
10 24 30				Initium Eclipseos circa 150° limbi in 95° sc. à puncto super. linea perpendicularis	10 25 5
10 29 4	I	1½ digit.		Nonagesimi ortum versus contigit.	
				Incedebat per M. Germanicianum, ad Mare Syrticum & Montem Acabe	10 30 30
10 32 13	2	2ferè		Per M. Porphyriten, loca Paludosa Ins. Cercina, Sinum Syrticum, per Mont. Sacrum & M. Casum	10 32 50
10 36 30	3	2½ ferè		Ad M. Baronium, Ins. Ethusam, per medium Sinum Syrbonis & M. Pharan	10 37 10
10 43 25	4	3½		Per Sinum Apollinis, M. Etnam, Ins. Letoam, ad Ins. Didymam	10 44 10
10 47 25	5	4½ dig.		Ad Ins. Majorcam, Vulcaniam, Lemnos, Carpathos & M. Horeb	10 48 15
10 53 20	6	5½		Ad Lacum Nigrum majorem, per M. Argentarium, Sipylum, Majscytum, Tabor, Sinai, & desertum Raphidim	10 53 10
10 55 45	7	(½)		Per scopulos hyperboreos, Ins. Besbycam, M. Olympum, Didynum & M. Antilibanum	10 56 40
11 0 33	8	7½ dig.		Ad Ins. Cyaneam, M. Horminium, M. Uxii & Montes Coibacaranes	11 1 30.
				Tempus.	

Tempus sec. horat. ambul.	Ordo Phasū	Digit. i Eclipt.	Altitudines Stellarum	Per quas Maculas transversant umbra. Sectiones. & que insuper notata fuerint	Tempus ex altit. correct.
h. " "					" "
II 4 30	9	8 $\frac{1}{2}$		Per M. Ambonum ad Ins. Apolloniam, & Sinum Athenensem, per M. Moeschum, Uxii, & Coibacaranos	II 5 30
II 9 59	10	9 $\frac{1}{4}$		Per Lacum Hyperboreum superiore, Pa- ludem Byces, per Montem Herculis, & Sinum extremum Ponti	II 10 55
II 13 30	11	10 dig		Per Lacum Hyperboreum inferiore, M. Cimmerium, & ad Sinum inferiore Maris Caspii	II 14 27
II 16 30	12	10 $\frac{1}{2}$ fere		Per M. Riphæos, Pal. Maeotidem, Ins. Alopeciam, ad Ins. majorem Caspii per M. Nerosum	II 17 17
II 19 10	13	11 $\frac{1}{2}$		Ad Ripam Paludis Maeotidis & Mont. Hippoci	II 20 10
II 22 0	14	11 $\frac{1}{2}$		Per M. Alanum, & Lacum Occident. minorem	II 23 0
II 26 30		12 dig		Totalis Obscuratio circa 297° limbi in 94° sc. à punto super. linea perpendicularis Nonagesimi ortum versus depre- hensa	II 27 30
			Altitudine		
II 35 36			Pollucis 52° 13'		II 37 4
II 37 35			Pollucis 52° 0		II 38 42
II 38 50			Pollucis 51° 41'		II 39 35
II 38 20	die 22	Feb. mine		Récuperatio luminis circa 118° limbi in 88° sc. à punto superiori linea perpendicularis Nonagesimi occasum versus extiit.	I 0 8
I 0 40	15	$\frac{1}{2}$ dig.		Ad M. Alabastrinum, M. Pentadafylum, M. Andum, & Pal. Maeotidem	I 2 31
I 3 35	16	1 $\frac{1}{2}$		Per M. Porphyritem, ad Mare Syticum & per M. Eom	I 5 32
I 8 10	17	2 fere		Per M. Baronium, loca Paludosa, Ins. Cer- cina, inter mare Syticum & Egyptia- cum ad S. Syrbonis.	I 10 32

Tempus sec. borol. ambul.	Ordo Phasii	Digitii Eclipt.	Altitudines Stellarum	Per quas Maculae transiverint umbra Sectiones, & qua insuper notata fuerint.	Tempus ex al- tit. correcendum.
h. 1. 11.					h. 1. 11.
I. 11 48	18	2 $\frac{1}{2}$ fere		Per Sinum Apollinis, Ins. Taraciniam, Ins. Ethusam, Sinumque Syrbonis	I. 13 54
I. 16 20	19	3 $\frac{1}{2}$		Ad Ins. Majorcam, per M. Etnam, M. Neptunum, Iachyntum, Ins. Letoam, Ins. Didymam & M. Lyon	I. 18 33
I. 20 50	20	4 $\frac{1}{2}$ dig.		Ad Ins. Corsicam, per Ins. Vulcaniam, & Carpathos, ad mare Mortuum, per desertum Sin	I. 23 6
I. 24 39	21	5 $\frac{1}{2}$ dig.		Ad M. Argentarium, mare Pamphilium, Ins. Cyprum per M. Horminium	I. 27 0
I. 26 15	22	6 fere		Per Mont. Apenninum, ad Lacum Trasimenum, ad Mont. Sipylum per M. inter. Libanum	I. 28 40
I. 28 32	23	6 $\frac{1}{2}$		Ad M. Carpathos, per Ins. Besbicam, M. Olympon, Didymum & M. Dalangeros	I. 31 0
I. 31 12	24	7 $\frac{1}{2}$ dig.		Per M. Perce, Byzantium ad M. Horminium, & per M. Antitaurum	I. 33 44
I. 35 59	25	8 $\frac{1}{2}$		Per Sinum Circinitem, Ins. Macram, Ins. Apolloniam, medium Montem Moschum, atque Montes Sogdianos	I. 38 37
I. 39 33	26	9 dig.		Per Lac. Hyperboreum inferiorem, Pal. Byces, M. Strobilum, per Sin. extremum Ponti ac M. Paropamisum	I. 42 15
I. 41 45	27	9 $\frac{1}{2}$ dig.		Inter Pal. Byces & Lacum Corosondamatis, per M. Herculis & M. Caucasum inferiorem	I. 44 30
I. 44 19	28	10		Per M. Cimmerium, M. Tancon, & M. Nero	I. 47 9
I. 47 20	29	10 $\frac{1}{2}$		Per Pal. Maotidem, Ins. minorem maris Caspii, Montemque Nero sum superiorum	I. 50 14
I. 51 44	30	11 paulus.		Per M. Alaunum, M. Sanctum, Montesq; Hippoci.	I. 54 42
I. 56 12		12 dig.		Finis circa 294° limbi in 97 sc. graduata puncto superiori linea perpendicularis Nonagesimi occasum versus contigit.	I. 59 17

Tempus

Tempus sec. horol. ambul.	Ordo Phasen	Digitii Ecclipt.	Altitudines Fixarum.	Per quas Maculas transfererat umbræ Sectiones, & qua insuper notata fuerint.	Tempus ex al- tit. correclum-
h. "					h. "
1 57 10				Densissima Penumbra	2 0 17
2 1 15				Satis adhuc crassa	2 4 27
2 2 30				Pauco dilutior	2 5 45
2 10 20				Penumbra dilutissima	2 13 42
2 12 30				Finis Penumbra	2 15 0
2 15 39			Altitudo Pollucis 29° 12'		2 19 7
2 17 35			Eadem Altitude 28° 46'		2 22 8

ANIMADUERTEADA

In Eclipsin Anno 1682, die 21 Feb.

Gedani observatam.

Cum Tabulae Rudolphinae bene notabilem hac die Eclipsin, & quidem totalem cum morâ ostenderent, quales exquisite observare raro alias contingit; proinde summa alacritate ad illam ex meâ rufus, DEI Benignitate, erectâ speculâ, attendi; præprimis cum cœlum omnino sudum extiterit, ut quævis exoptatissima hâc in parte mihi pollicerer. Totum igitur diem 21 Febr. impendi, partim ut horologia ad Sciatericum lineæ Meridianæ applicatum d'figerem, atque sic omnia parata haberem, quæ ad ejus generis Observationes requiruntur.

Ingentuente Eclipsi umbra erat vasde diluta, limbusq; ejus quasi anfractuosus, & minime terminatus, sic ut difficulter admodum ab initio Phases determinari potuerint, nec accurate distingui, per quas Maculas umbra transibat, successu tamen temporis crescente Eclipsi, distinctius omnia deprehendebantur. Color ab initio videbatur satis tristis, obscurus, & fuliginosus, ac si Eclipsis, eadem ratione, circa maximam obscurationem, ut illa Anno 1642. mens. April. adeo se obumbratam fistere vellet, quod vix conspiceretur; sed res plane aliter cecidit, siquidem Luna cum jam omnino esset eclipsata, totus tamen ejus discus satis clare in oculos incurrebat: color namq; ejus tum

tum omnino rubidus sive sanguineus, aut rubiginosus erat, qui eousq; perseverabat, donec *Luna* ad medietatem lumen suum recuperasset, atq; tum rursus satis obscura & fuliginosa apparuit; adeò ut omnium optime *Phases* omnes, per quasnam nimurum *Maculas* umbra transierit, annotatae fuerint. In summâ, hujus *Eclipses* observatio ex voto nobis successit; non solùm enim Initium & Finem, sed etiam ipsum momentum totalis Obscuratio, & Recuperationis luminis, cum 30 phasibus (quod raro admodum contingit) diligentissime mihi deprehendere Cœlum indulxit. Per quas verò *Maculas* umbræ seætiones incesserint, cum quid amplius notatu dignum sub tempore *Eclipses* extiterit, ex ipsa observatione atq; delineationibus ad oculum clare patet, non minus ex subsequenti *Tabella* quousq; *Calculus R. dolphinus* ab hac observatione, atq; sic ab ipso Cœlo discedat.

	<i>Ex Calculo</i> Rudolphino	<i>Ex Obser-</i> <i>Vatione.</i>	<i>Differentia.</i>
Initium <i>Eclipses.</i>	10 13 33	10 25 5	11 32 Tardius
Totalis Obscuratio.	11 10 11	11 27 30	17 19 Tardius
Maxim: Obscuratio.	0 5 43	0 13 49	8 6 Tardius
Recuperatio lumin.	1 1 15	1 0 8	1 7 Citius
Finis <i>Eclipses.</i>	1 57 53	1 59 17	1 24 Tardius
Mora totalis obscurat.	1 51 4	1 32 38	18 26 Brevior
Tota duratio <i>Eclipses</i>	3 44 20	3 34 12	10 8 Brevior

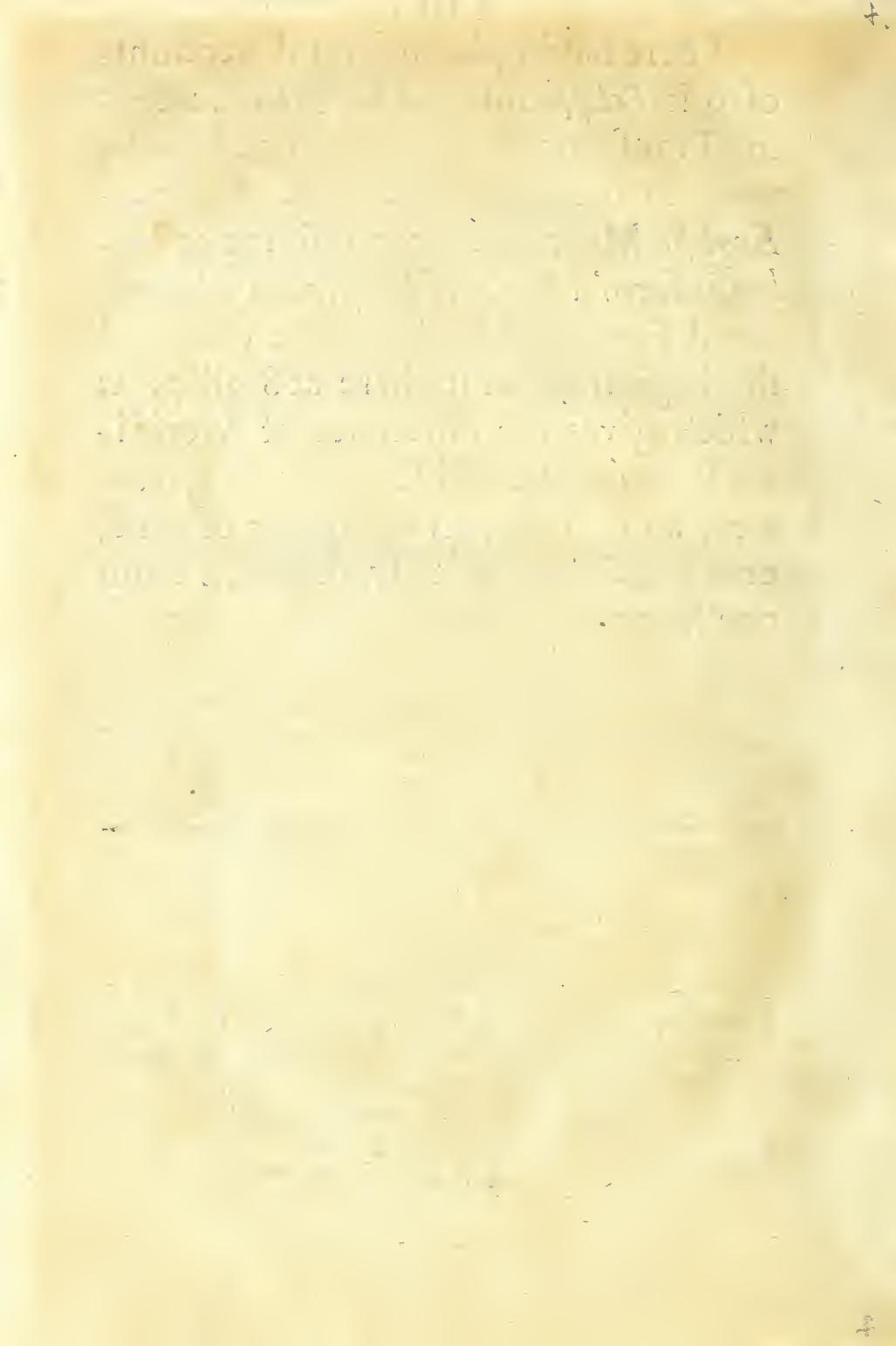
There having been several Accounts of this *Eclipse* inserted in Two succeeding Transactions, it may not perhaps be unfit to mention what Mr. *Jacobs* an *English Merchant* now residing at *Lisbon*, inform'd Mr. *J. Flamsteed* in a Letter dated *June 15. 1682.* That He observed the beginning of it there at $8^{\circ} 31' p.m.$ which gives the difference of Meridians betwixt the Observatoy at *Greenwich*, and *Lisbon*, $41\frac{1}{2}$ Minutes of time, or $10^{\circ} 22'$ considerably different from our Mapps and Sea-Charts.

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to the University, and are to be sold by *Hen. Rogers*
at the Sign of the *Bible* in *Westminster Hall*, and
Sam. Smith at the *Princes-Arms* in

St. Pauls Church-yard,

1683.



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Tyson
1683

